Editorial

What is a species?

When I pose this question to our second-year bachelor students, they always offer thoughtful suggestions. The first usually refers to Ernst Mayr's biological species concept, which defines species as groups capable of producing fertile offspring. But, drawing on their field experience with plants and invertebrates from their first year, they quickly bring up the morphological species concept as well. From there, we discuss the strengths and weaknesses of different ways to define species, and how using different concepts and character sets can lead to conflicting conclusions. These discussions are always lively, and I never tire of debating this question with our biology students.

It is fascinating to reflect on the uncertainty surrounding the definition and boundaries of what is arguably the most fundamental unit in biodiversity science. Just imagine trying to conduct conservation work, natural resource management, ecological research or genomics without being able to refer to 'species'. Even food production, trade, and public health rely on our capacity to recognise, differentiate, and name species. The taxonomic baseline we provide is truly essential for discussing and understanding the natural world.

As all readers of *CHIRONOMUS* know, delimiting and distinguishing species in the Chironomidae is far from straightforward. Even species that seem easy to identify for a trained chironomidologist often turn out to be more complex once genetic variation among populations is examined using DNA barcodes. Although genetic data improve our understanding of species boundaries, they do not always give a final answer. Expert interpretation and experience still play an important role. For this reason, an integrative approach that brings together multiple lines of evidence – including morphological, molecular, and life history aspects – is needed to develop the strongest possible species hypotheses (see for instance Raunio and Brodin 2025 in this issue).

Ultimately, this is what taxonomy deals with: species hypotheses that are tested, refined, and evaluated by the scientific community. Sometimes, integrative research leads to new conclusions, as illustrated by the case of *Parametriocnemus adzharicus* in this issue of *CHIRONOMUS* (Widmann et al. 2025). In other cases, new data support existing hypotheses. Either way, the process of getting there—through rigorous, peer-reviewed, and reproducible science—is what drives the field forward.

The *CHIRONOMUS Journal of Chironomidae Research* therefore remains fully committed to publishing high-quality, open-access research that strengthens the taxonomic foundations on which all biodiversity science depends.

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References

Raunio, J. and Brodin, Y. 2025. *Cryptotendipes usmaensis* (Pagast, 1931) – a cryptic species of Chironomidae (Insecta, Diptera). *CHIRONOMUS Journal of Chironomidae Research*. 39: 23-28. DOI: https://doi.org/10.5324/cjcr.v0i39.6375

Widmann, C., Marle, P. and Brodin, Y. 2025. A new species of *Parametriocnemus* Goetghebuer, 1931 (Diptera: Chironomidae: Orthocladiinae) from Switzerland and elevation of *P. stylatus adzharicus* Kownacki & Zosidze, 1973 to full species. - *CHIRONOMUS Journal of Chironomidae Research*. 39 (Jun. 2025), 4–12. DOI: https://doi.org/10.5324/cjcr.v0i39.6282